

Addendum #3

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Project Name: Public Building Commission
Courthouse Plaza Remodel
645 South 9th Street, Lincoln, Nebraska
Project No.: Bid Number 07-152 Architects Project No: 06008
Issued: May 14, 2007
Bid Date: 12:00 noon Wednesday, **May 23, 2007**
Bid Opening: "K" Street Complex Suite 200, 440 South 8th Street
Location: Lincoln, Nebraska 68508

This Addendum is issued to all known bidders before receipt of proposals. This Addendum is to authorize the use of the following information in preparing proposals for the above named project. The bidder **must** enter the number of this Addendum on the **Proposal Sheet**.

PART 1 - GENERAL INFORMATION

- 1.1 Refer to the Notice to Bidders.
 - A. **The Bid date has been changed to Wednesday May 23, 2007.** The time remains the same; 12:00 noon.
- 1.2 Window Coverings. The size of the window coverings is to be determined by the bidder. The jobsite is available to review the existing conditions. To arrange for access to the site please contact Bob Bourke of County City Property Management at 430-4612.
- 1.3 See the attached Mechanical and Electrical items that are a part of this addendum.

PART 2 - MODIFICATION TO THE DRAWINGS

- 2.1 Sheet G100
 - A. Refer to A6/G100 steel support; There are no applications for this detail on this project. Disregard this detail.

2.2 Sheet A100

- A. Refer to A1/A100, Basement Floor Plan; the coat hooks noted next to door 017b, are to be Hafele, Coat Hook, 885.06.209 and are to be fastened to poplar 1 x 4 that is fastened to the wall and painted. The hooks are to be mounted 5'-0" above the floor.

2.3 Sheet A101

- A. Refer to room Janitor Closet 206A. A mop / broom holder, specified in 102800 is to be installed in this room.

2.4 Sheet A400

- A. Refer to the Door Schedule. The coat hooks that are noted are to be Hafele, Coat Hook, 885.06.209

PART 3 - MODIFICATION TO THE SPECIFICATIONS

- 3.1 Refer to Section 055213 – Pipe and Tube Railings included with this addendum for information relative to the fabrication and installation of the new stair hand and guardrails referred to in Addendum Number Two.
- 3.2 Refer to Section 07841 – Through Penetration firestopping included with this specification. Install firestopping in all locations where fire rated assemblies are penetrated.
- 3.3 Refer to Section 102800, Article 2.3 Underlavatory Guards
 - A. Delete this article. These are specified in the mechanical section of the specification.

End of Addendum #3

Bidders List – Courthouse Plaza Remodel

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(This is not an Addendum)

Company	Date Filled	Delivery Method	Set Issued
Lincoln Builders Bureau	4/25/07	Mailed	4
McGraw-Hill/Dodge Report	4/25/07	Mailed	5
Omaha Builders Exchange	4/25/07	Mailed	6
City County Purchasing	4/25/07	Mailed	7
Cable Guyz Communications 9230 Whitehall Ln Lincoln, NE 68526	4/25/07	Customer Pick-up	8
Rogge General Construction 6101 S. 58 th Street, Suite A Lincoln, NE 68516	4/26/07	Customer Pick-up	9 - 11
The Weitz Company 3201 Pioneers Blvd, Suite 110 Lincoln, NE 68502	4/27/07	Customer Pick-up	12 - 14
The Waldinger Corporation	4/27/07	Customer Pick-up	15
Middleton Electric 4921 Bunker Hill Road Lincoln, NE 68521	4/27/07	Customer Pick-up	16
Progressive Electric 3420 N. 35 th Circle Lincoln, NE 68504	5/1/07	Customer Pick-up	17
Beaver Electric, Inc. 3025 N. 35 th St., Suite 3 Lincoln, NE 68504	5/10/07	Customer Pick-up	18
Commonwealth Electric 1901 Y Street, Suite 100 Lincoln, NE 68501	5/1/07	Customer Pick-up	20

Public Building Commission – Courthouse Plaza Remodel

Company	Date Filled	Delivery Method	Set Issued
Cheever Construction Company 912 S. 26 th Street Lincoln, NE 68510	5/1/07	Customer Pick-up	21 – 23
Wolfe Electric 7121 Amanda Road Lincoln, NE 68507	5/1/07	Customer Pick-up	24
Johnson Controls 15212 Edna St. Omaha, NE 68138	5/2/07	Customer Pick-up	25
A.A. Leupold & Son, Inc. 1400 Centerpark Rd Lincoln, NE 68512	5/2/07	Customer Pick-up	26
Falcon Heating & Air 4520 N. 48 th St. Lincoln, NE 68504	5/3/07	Customer Pick-up	27
Cornhusker Heating & Air 2959 Cornhusker Hwy Lincoln, NE 68501	5/3/07	Customer Pick-up	28
H& S Plumbing 1720 Cushman Drive Lincoln, NE 68512	5/4/07	Customer Pick-up	29
JK Electric 1217 Mulder Dr Lincoln, NE 68510	5/4/07	Customer Pick-up	30
Bryant Heating & Air 5401 Cornhusker Hwy Lincoln, NE 68504	5/4/07	Customer Pick-up	31
Mechanical Western PO Box 81111 Lincoln, NE 68501	5/4/07	Customer Pick-up	32
NIFCO Mechanical Systems, Inc 531 Sumner Lincoln, NE 68502	5/4/07	Customer Pick-up	33
Kidwell Electric Co, Inc. 900 S. 26 th Street Lincoln, NE 68510	5/4/07	Customer Pick-up	34
Kaser Painting 3130 S 7 th Street Lincoln, NE 68502	5/4/07	Customer Pick-up	35
HEP, Inc. 5831 S. 58 th Street, Suite C Lincoln, NE 68516	5/7/07	Customer Pick-up	36
Sentry Electric 3400 Gladstone Lincoln, NE 68504	5/7/07	Customer Pick-up	37
David Wood Construction 2600 West M Court Lincoln, NE 68522	5/7/07	Customer Pick-up	44

Public Building Commission – Courthouse Plaza Remodel

Company	Date Filled	Delivery Method	Set Issued
Gregg Electric 3521 N. 22 nd Street Lincoln, NE 68521	5/8/07	Customer Pick-up	45
Engineered Controls 3116 S. 13 th St. Lincoln, NE 68502	5/8/07	Customer Pick-up	46
Wellman Plumbing 3130 S. 6 th St. #100 Lincoln, NE 68502	5/8/07	Customer Pick-up	47
Designer Woods, Inc. 9314 North 45 th St Omaha, NE 68152	5/8/07	Customer Pick-up	48A
Wilmar Electric 1441 Adams St. Lincoln, NE 68521	5/9/07	Customer Pick-up	48B
Benes Heating & Air 5580 W. Mill Rd. Raymond, NE 68428	5/8/07	Customer Pick-up	49
North Star Construction 5020 N. 15 th Lincoln, NE 68521	5/9/07	Customer Pick-up	50
Capitol City Electric PO Box 6778 Lincoln, NE 68506	5/9/07	Customer Pick-up	51
DSI Door & Hardware 1610 Cornhusker Hwy Lincoln, NE 68521	5/9/07	Customer Pick-up	52
Platte Valley Co	5/14/07	Customer Pick-up	53
Neco Security	5/14/07	Customer Pick Up	54
Bob & Don's Plumbint	5/14/07	Customer Pick Up	55

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Steel pipe and tube railings.

1.3 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

- 1. Steel: 72 percent of minimum yield strength.

- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

- 1. Handrails:

- a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.

- 2. Top Rails of Guards:

- a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.

- 3. Infill of Guards:

- a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.

1.4 SUBMITTALS

- A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- B. Welding: Qualify procedures and personnel according to the following:
 1. AWS D1.1, "Structural Welding Code--Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Steel Pipe and Tube Railings:
 - a. Pisor Industries, Inc.
 - b. Sharpe Products.
 - c. Wagner, R & B, Inc.; a division of the Wagner Companies.
 - d. Midwest Steel

- e. Steel Fabricators
- f. Apollo Steel

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 STEEL AND IRON

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).
- C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Provide galvanized finish for exterior installations and where indicated.
- D. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- E. Castings: Either gray or malleable iron, unless otherwise indicated.
 - 1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
 - 2. Malleable Iron: ASTM A 47/A 47M.

2.4 FASTENERS

- A. General: Provide the following:
 - 1. Steel Railings: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 - 3. Provide Phillips-head machine screws for exposed fasteners, unless otherwise indicated.

- D. Anchors: Provide chemical or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections, unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.
 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

- I. Form changes in direction as follows:
 - 1. As detailed.
 - 2. By bending or by inserting prefabricated elbow fittings.
- J. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- O. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 STEEL AND IRON FINISHES

- A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed railings:
 - 1. Interior Railings (SSPC Zone 1A): SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
- B. Apply shop primer to prepared surfaces of railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop

painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

3.3 ANCHORING POSTS

- A. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- B. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.4 ANCHORING RAILING ENDS

- A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.

- B. Anchor railing ends to metal surfaces with flanges welded to metal surfaces.

3.5 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.
 - 1. Use type of bracket with predrilled hole for exposed bolt anchorage.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3.6 ADJUSTING AND CLEANING

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

- 1. Floors.
- 2. Walls and partitions.
- 3. Smoke barriers.
- 4. Construction enclosing compartmentalized areas.
- 5. Blank openings.

- B. Related Sections include the following:

- 1. Division 3 Section "Cast-in-Place Concrete" for construction of openings in concrete slabs and walls.
- 2. Division 7 Section "Building Insulation" for safin insulation and accessories.
- 3. Division 15 Sections specifying duct and piping penetrations.
- 4. Division 16 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

- 1. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
- 2. Fire-resistance-rated floor assemblies.

- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814 and UL1479, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814 and UL1479, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

- 1. Penetrations located outside wall cavities.
- 2. Penetrations located outside fire-resistive shaft enclosures.
- 3. Penetrations located in construction containing fire-protection-rated openings.

4. Penetrating items larger than 4-inch- (100-mm-) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations documentation of UL firestop systems to be used and Manufacturer's installation instructions.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.
- F. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineer's Judgement must include both project name and contractor's name who will install Firestop system as described in drawing.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:.

- a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
- b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

- 1) UL in "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site, undamaged, in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. Do not use damaged or expired materials.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.
- C. Do not use materials that contain flammable solvents.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or pre-approved substitution:
 1. Hilti Construction Chemicals, Inc.
 2. Johns Manville

3. Tremco
4. 3M Fire Protection Products.
5. Tremco.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.
- L. Fireblocks: Intumescent flexible back for sealing single or multiple penetrations in smaller large openings, temporary or permanent sealing of cables and cable tray penetrations or sealing of insulated and non-insulated metallic pipes and combustible pipe penetrations.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.
- D. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
- E. Do not proceed until unsatisfactory conditions have been corrected.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Penetration inspections: Architect and City Inspectors will inspect through-penetration firestop systems prior to the completion of other work that would enclose or obscure the penetrations. Inspections would be documented in field observation Reports.
- B. Inspection of through-penetration Firestopping shall be performed in accordance with ASTM E174, "Standard Practice for On-site Inspection of Installed Fire Stops" or other recognized standard.

- C. Proceed with enclosing through-penetration firestop systems with other construction only after work has been accepted by Architect.
- D. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07841

Project: Courthouse Plaza
Project No.: Engineers Project No.: 06-210
Engineer: Engineering Technologies, Inc.
Sharp Building, 206 South 13th Street, Suite 800, Lincoln, NE 68508
Issued: May 7, 2007
Bid Date: May 16, 2007

ADDENDUM # 3

This addendum is issued by the Engineer to all known bidders before receipt of proposals. This Addendum is to authorize the use of the following information in preparing proposals for the above named project. Bidder shall acknowledge the receipt of this addendum on the **Proposal Sheet** and all information contained herein shall become a part of the contract documents.

PART 1 - MECHANICAL - PRIOR APPROVALS

- 1.1 The following items shall be considered as "an equal" for bidding purposes. Final approval is subject to shop drawing review.

ITEM

Backflow Preventer
Cabinet Unit Heater

Domestic Circulator
Exhaust Fan
Expansion Tanks
Fan Coil Unit
Faucets
Fire, Fire Smoke Dampers
Flexible Pump Connectors
Gauges
Glycol Make Make-up Package and
Air & Dirt Separators with
Coalescing Medium
Horizontal Unit Heater
HVAC Pumps
Louver
Motorized Dampers
Pipe/Duct Identification
Pressure Reducing Valve
Registers, Grilles, Diffusers
Relief Fan

Relief Valve
Roof Hoods
Submersible Sump Pump
Thermometer
Variable Air Volume Boxes
Variable Speed Drives
Variable Frequency Drives
Unit Heater

MANUFACTURER

Conbraco
Enviro-Tec, McQuay, Rittling,
Sterling, Vulcan
Taco
Twin City Fan, Loren Cook
S.A. Armstrong
Airtherm, Enviro-Tec, McQuay
Speakman
Greenheck
Metraflex, Twin City Hose
Winters Instruments
Wessels

McQuay
Paco
Arrow United
Greenheck
Brimar
Conbraco
Titus
Twin City Fan, Loren Cook,
Greenheck
Conbraco
Loren Cook
Paco, Stancor
Winters Instruments
Price Industries
ABB, Greenheck
General Electric
Enviro-Tec, McQuay, Rittling,
Sterling, Vulcan

PART 2 – MECHANICAL CLARIFICATIONS

- 2.1 All existing horizontal ductwork shown on the drawings to remain, shall be re-supported, be re-sealed, patched to make air tight, and receive duct wrap.
- 2.2 The existing 4" waste and vent piping located in the main vertical shaft shall be removed from the roof to the sewage ejector.

PART 3 – CLARIFICATIONS TO MECHANICAL SPECIFICATIONS

- 3.1 Please insert attached specification section 15 900 to the document.

PART 4 – CHANGES TO MECHANICAL DRAWINGS

- 4.1 Exhaust fan #5 added to Closet 112 for ventilation. See drawing H200-1 enclosed.
- 4.2 Exhaust fan #6 added to Closet 200 for ventilation. See drawing H201-2 enclosed.
- 4.3 Exhaust fan #7 added to Closet 309 for ventilation. See drawing H201-2 enclosed.
- 4.4 Diffuser, Grille, and Register Schedule added. See drawing M302-3 enclosed.
- 4.5 Exhaust fans 5, 6, 7 added to schedule. See drawing M302-4 enclosed.

PART 5 – ELECTRICAL CLARIFICATIONS

- 5.1 Delete any reference to voice evacuation in the fire alarm specification 16300. The audio annunciation shall be horn only.
- 5.2 For clarification, the plywood telephone boards and all data racks shall be provided by the bidding contractor not the city electricians.
- 5.3 For clarification, the bidding contractor shall include in their price a cost to cut and patch the existing asphalt by the existing LES transformer for installation of the new secondary electrical conduits.
- 5.4 For clarification, the speakers, wiring and speaker installation shall be by the bidding contractor. Provide DuKane 8" ceiling speaker (5A607) with white metal baffle and backbox. Provide one dual-channel amplifier. Wiring shall be installed to Comm Closet 004 and amplifier installed in this room also.

PART 6 – ELECTRICAL – PRIOR APPROVALS

- 6.1 The following items shall be considered as "an equal" for bidding purposes. Final approval is subject to shop drawing review.

ITEM

Fire Alarm System
Light Fixtures # 1-17
Light Fixture # 4
Light Fixture # 16

MANUFACTURER

Notifier
Hubbell Lighting
Axis Lighting
Cooper Lighting

PART 7 – CHANGES TO ELECTRICAL DRAWINGS

- 7.1 Exhaust fans EF-5, EF-6 and EF-7 to be added to the Comm. Closets on 1st, 2nd and 3rd floors. See Sheet E200 attachment # 1 and Sheet E201 attachment # 1 & 2 included in this addendum for locations of the exhaust fans. Provide 1 – 20A/1P circuit breaker for each exhaust fan. Breakers to be installed in the panels that are located on the same floor as each exhaust fan.

- 7.2 Sheet E100, E101, E200, E201: General Note 1 shall be changed so that the entire fire alarm system will be bid including, all conduits, boxes, wiring, devices, equipment, final connections and testing. The city electricians will provide nothing for the fire alarm system.
- 7.3 Sheet E200, Note 12 should refer to Sheet E301.
- 7.4 Sheet E300 – the 100A/3P circuit breaker in Panel “MDP” for the existing elevator does not need to have shunt-trip.
- 7.5 Sheet E200 – Provide a weatherproof fire alarm horn on the exterior of the south wall.

END OF ADDENDUM #~~1~~ 3

DIVISION 15 - MECHANICAL
SECTION 15900 - TEMPERATURE CONTROLS

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DIVISION 15 - MECHANICAL
SECTION 15900 - TEMPERATURE CONTROLS

1. SCOPE

- a. The work under this Section shall include furnishing and installing all materials for the complete installation of the automatic temperature control systems which shall consist of all thermostats, valves, operators, and other accessory equipment as necessary to fill the intent of the Specifications. All work shall be as hereinbefore specified under Section 15050, "Mechanical - Basic Materials and Methods".
- b. Temperature control system shall be a complete electronic microprocessor based direct digital temperature control system as shown on the Drawings and specified herein and shall be Johnson Controls "Metasys". The system shall be an extension of the existing Johnson Control system currently in place which serves the Hall of Justice.
- c. The control system shall be installed by competent control mechanics and electricians regularly employed by the Manufacturer or authorized representative of the control equipment. The Installing Contractor shall have at least five (5) years experience in the local area.

2. DESCRIPTION OF WORK

- a. The primary work in this Contract shall consist of providing a new temperature control system in a remodeled building. The control system shall consist of control of temperature and a ventilation system for the building and primarily involving air handling units, hot and chilled water systems, variable volume system boxes, fin tube, and an exhaust system.
- b. The control system shall consist of furnishing and installing all sensors, temperature transmitters, controllers, switches, control panels, and other accessory equipment along with a complete system of electrical wiring to fill the intent of the Specification and provide for a complete and operable DDC system. All control equipment shall be fully proportioning, except as noted otherwise.
- c. The direct digital control system shall monitor and control all points as listed on the Point List or described in the sequence of operation. All mechanical equipment shall be controlled through the use of direct digital control.

3. WORK AND MATERIAL NOT INCLUDED

- a. The following motor starters shall be furnished and installed by the Electrical Contractor under Division 16000 or furnished as part of the equipment itself such as the condensate pump:
 - (1) Domestic hot water heating circulators
 - (2) Three (3) hot water heating circulators
 - (3) Two (2) chilled water circulators
 - (4) Exhaust, relief, or supply fans

- (5) Cabinet Unit Heaters
- (6) Horizontal Unit Heater
- (7) Fan Coil Unit

- b. Variable speed drives for the air handling unit shall be provided by the Sheet Metal Contractor under Section 15300.
- c. Variable speed drives for the relief air fan shall be provided by the Sheet Metal Contractor under Section 15300.
- d. Variable speed drives for hot water circulating pumps (HWP-1 & HWP-2) shall be provided by the Contractor under Section 15250.

4. SHOP DRAWINGS

- a. Contractor shall submit seven (7) copies of Shop Drawings and rough-in data on all equipment listed below to the Architect for acceptance before ordering.
- b. Shop Drawing data shall include the following:
 - (1) Diagrammatic layouts.
 - (2) Written description of operation, sufficiently detailed and explanatory, suitable for incorporating same in the operating instructions.
 - (3) Descriptive literature of all equipment, valves, instruments, etc. used.

5. GUARANTEE

- a. The control system herein specified shall be free from defects in workmanship and material under normal use and service. If within 12 months from date of acceptance by the Architect, any of the new equipment herein described is proved to be defective in workmanship or material, it will be replaced or repaired free of charge.

6. INSTRUCTION AND ADJUSTMENT

- a. Upon completion of the job the Control Contractor shall completely adjust, ready for use, all thermostats, valves, relays, etc. provided under this contract. The Control Contractor shall provide three (3) complete instruction manuals covering the function and operation of all control components on the job.
- b. At the completion of the work and at a time agreeable with the Owner and Contractor the Temperature Control Contractor shall provide a technician to assist the Contractor in providing operating instructions to the Owner which shall be a minimum of three (3) eight-hour days or longer time period if required.

7. OPERATION AND MAINTENANCE MANUALS

- a. The Temperature Control Contractor shall provide at the completion of the project a complete and up-to-date control schematics and operating descriptions and instructions of all control systems provided under this Section.

- b. Provide three (3) copies of as-built drawings and maintenance instructions to the Owners operation and maintenance personnel in addition to the three (3) required in the Operation and Maintenance Manuals.

8. MOTORIZED CONTROL VALVES

- a. All automatic control valves as furnished by the Control Contractor shall be installed by the Heating and Air Conditioning Piping Contractor under Section 15250 under the Control Contractor's supervision.
- b. All water valves shall have modulating plugs and inner valve construction (or ball valves on 1" or smaller valves) to insure true modulation of flow and shut-off features as the application demands. All valves are to be equipped with operators of sufficient size to insure tight seating against the working pressure.
- c. Valves 2" and smaller shall be provided with sweated ends and self-adjusting packing. Valves 2-1/2" and larger shall have iron bodies with flanged ends. Valve bodies shall be rated at a maximum fluid pressure of 125 psi.
- d. Shop Drawings submittals shall include the pressure drop through the control valve at full flow and the maximum pressure drop shall be limited to 10' through water valves and 2 psi for steam valves. A valve pressure drop schedule shall be submitted with the shop drawings.

9. TEMPERATURE CONTROL WIRING

- a. All control wiring required for a complete and operating system, as herein specified, shall be furnished and installed by the Temperature Control Contractor unless specifically shown on the Electrical Drawings.
- b. The term "wiring" shall be construed to include the providing of conduit, wire, miscellaneous materials, and labor as required for installation and connection of the electrical control devices furnished as part of the control system or furnished by Equipment Suppliers.
- c. This wiring shall include all electrical connections required as specified in the Sequence of Operation. All devices and wiring required for interlocking HVAC equipment as specified in the Sequence of Operation shall be furnished by the Temperature Control Contractor.
- d. All line and low voltage wiring materials and installation covered by this Section shall be in accordance with the latest revision of the National Electric Code and applicable local codes and shall carry the UL label where applicable.
- e. The control equipment and connecting of wiring shall be installed in a neat and workmanlike manner. All line voltage wiring shall be installed in metal conduit. All low voltage wiring shall be run in plenum cable. All cable shall be neatly bundled and supported above the ceilings, not run loose lying on the tile. All conduit shall be run parallel to, or at a right angles to, the building structure when exposed. Conduit shall be concealed in finished spaces. Conduit may be run

exposed in mechanical rooms, penthouse, or boiler room or in areas where other piping is exposed.

- f. Line voltage wiring shall be run in adequately supported metal rigid raceway or EMT pipe. Wiring in equipment rooms shall be in one of the metal containers mentioned above. Where connections are may being made to vibrating equipment, connections shall be made by running conduit to within 6" of the final termination and then using wiring protected by a suitable protective grommet and the end of the securely fastened metal conduit.
- g. All conduit shall conform to Division 16000 of the contract documents. All conduit shall be a minimum of 1/2" diameter and set screw connectors in conduit shall not be used.

10. CONTROL DAMPERS

- a. Damper blades shall be parallel or opposed blade as application requires. Applications where dampers are used to mix air shall be parallel blade. Dampers frames are to be constructed of formed galvanized sheet steel for structural strength equal to 11 gauge. Flexible metal jamb seals and polyurethane foam blade seals with synthetic bearings shall be provided. Damper blades are to be constructed with 16 gauge galvanized steel. Damper blade width shall not exceed nominal 8 inches. Dampers shall not have leakage grater than 1%. Damper shall be rated to operate over a temperature range of -40°F to 150°F. Dampers shall be Ruskin Model RCD-45.

11. SENSORS/PERIPHERAL EQUIPMENT

- a. Sensors, transmitters, and peripheral equipment shall be as specified suitable for direct connection to DDC Controls.
- b. Temperature sensors shall be of the 10,000 ohm thermistor type with a highly stable, precision thermistor material accurate to with + or - .36°F. Sensors shall be available for room, duct, or well mounting. Sensors shall connect to controller by means of a two-wire unshielded cable. Sensors shall be available in various ranges to properly suit the application.
- c. Outdoor air sensor shall be of the 10,000-ohm thermistor type with high resistance change verses temperature change. Accuracy shall be + or - 1°F temperatures in the -30°F to 230°F range. Sensor shall be available for outdoor or duct mounting. Sensor shall connect to remote controller by means of a two-wire unshielded cable.
- d. Differential pressure sensors shall vary its output voltage with a change in differential pressure. Sensors shall be available in various ranges to properly suit the application. Accuracy shall be + or -1% of range.
- e. Digital differential pressure sensors shall be provided for status indication on all fans and pumps. Relay feedback will not be acceptable.

- f. Electric to pneumatic transducers shall accept a 4-20 ma input and output 0-20 psi for control of pneumatic devices.
 - g. Location of sensing devices shall be so that an accurate reading of the environment sensed is achieved as well as adequate protection for the sensing devices. Room sensors shall be mounted with the top of the sensor 48" above floor.
 - h. Temperature sensors for the VAV box controllers, AHU'S, and unit heaters shall include the following:
 - (1) Temperature thermistor
 - (2) Temperature setpoint dial
 - (3) Occupied/unoccupied override button or sensor
- The temperature setpoint adjust will enable the tenants to turn the setpoint up or down themselves to approximately $\pm 3^{\circ}\text{F}$ of computer setpoint.
- i. All automation wiring which penetrates the building skin for connection to equipment shall be provided with lighting protection for each conductor, including high energy dissipaters, series control elements and voltage limiters.
 - j. A metal wall plate shall be used for the sensors for the following area:
 - (1) All corridors
 - (2) Vestibules
 - (3) Mechanical rooms
 - (4) Storage rooms

12. ACTUATORS

- a. Electric actuators shall be of the push-pull or rotating type for either modulating or two position control. Actuators shall stroke by a rotating motion of an overload-proof synchronous motor. Control voltage shall be either 24 VAC or 0-20 VDC as required by the application.

13. NETWORKING/COMMUNICATIONS

- a. Local Network
 - (1) Network Controller: The Network Controller shall directly oversee a local network such that communications may be executed directly to and between DDC's.
 - (2) Global Data Sharing: Global Data Sharing or Global point broadcasting shall allow point data to be shared between DDC's when it would be inefficient or impractical to locate multiple sensors.
- b. Dial-Up Communications: Auto-dial/auto-answer communications shall be provided to allow Digital Panels to communicate with remote operator terminals on an occasional basis via telephone lines.

- (1) Dial-Up Digital Panels: Auto-Dial Digital Panels shall automatically place calls to remote terminals to report critical alarms.
 - (a) Digital Panels shall analyze and prioritize all alarms to minimize the initiation of calls. Non-critical alarms shall be buffered in memory and reported as a group of alarms, or until an operator manually requests a report of all alarms.
 - (b) The auto-dial program shall include provisions for handling busy signals, "no-answers", and incomplete data transfers. Default devices shall be called when communications cannot be established with primary devices.
- (2) Dial-Up Remote Operator Terminals: Operators at dial-up remote operator terminals shall be able to perform all control functions and all data base generation and modification functions as described for local operator terminals connected via the RS-232 port. Routines shall be provided to automatically answer calls, and display information sent from remote Digital Panels. The fact that communication is taking place with remote control systems over telephone lines shall be completely transparent to an operator.
- (3) Modem Characteristics: Dial-up communications shall make use of Hayes compatible 9600 baud modems and voice grade telephone lines. Each Digital Panel shall have its own modem for remote monitoring or diagnostics purposes.

14. DATA SERVER

- a. As part of this project, a new data server shall be provided at the H.O.J. This server shall accumulate data and provide trending reports/data.

15. WEB SERVER

- a. The Temperature Controls Contractor shall provide a separate Internet server as part of the controls system. This will allow the Engineer to monitor the system and assist the Owner in the operation of the system.
- b. Contractor shall provide the Engineer with all necessary passwords to allow him to view the system and its operation on the Internet.

16. NETWORK CONTROLLER

- a. General: Network Controller shall be microprocessor-based, multi-tasking, multi-user, digital control processors.
- b. Serial Communication Ports: Network Controllers shall provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices, such as laptop computers, personal computers, and video display terminals.

- c. Hardware Override Monitoring: Network Controller shall monitor the status of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited.
- d. Powerfail Restart: In the event of the loss of normal power, there shall be an orderly shutdown of the Network Controller to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data, and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.

17. SYSTEM SOFTWARE

- a. Energy Management Applications: Network Controller shall have the ability to perform any or all of the following energy management routines:

Time of Day Scheduling
 Calendar Based Scheduling
 Holiday Scheduling
 Optimal Start
 Optimal Stop
 Demand Limiting
 Load Rolling
 Heating/Cooling Interlock
 Average/High/Low Signal Select and Reset

All programs shall be executed automatically without the need for operator intervention, and shall be flexible enough to allow user customization. Programs shall be applied to building equipment described in the "Execution" portion of this Specification.

- b. Alarm Management: Alarm management shall be provided to monitor, buffer, and direct alarm reports to operator devices and memory files. Each Network Controller shall perform distributed, independent alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic, and prevent alarms from being lost. At no time shall the Digital Panel's ability to report alarms be affected by either operator activity at the local I/O device, or communications with other DDC's on the network:
 - (1) Point Change Report Description: All alarm or point change reports shall include the point's English language description, and the time and date of occurrence.
 - (2) Prioritizing: The user shall be able to define the specific system reaction for each point. Alarms shall be prioritized to minimize nuisance reporting and to speed operator response to critical alarms. A minimum of four (4) priority levels shall be provided. Users shall have the ability to manually inhibit alarm reporting for each point. The user shall also be able to define conditions under which point changes need to be acknowledged by an operator, and/or logged for analysis at a later date.

- (3) Report Routing: Alarm reports and messages shall be directed to an operator device.
 - (4) Alarm Messages: In addition to the point's descriptor and the time and date, the user shall be able to print, display or store a 60 character alarm message to more fully describe the alarm condition or direct operator response.
 - (5) Auto-Dial Alarm Management: In Dial-up applications, only critical alarms shall initiate a call to a remote operator device. In all other cases, call activity shall be minimized by time-stamping and saving reports until a manual request is received, or until the buffer space is full. The alarm buffer must store a minimum of 50 alarms.
 - (6) Remote Alarm Horn: Each Network Controller shall be capable of triggering a binary output on a DDC when a critical or network alarm is received. The alarm horn feature shall be silenced when the critical alarm is acknowledged.
- c. Trend Analysis: A data collection utility shall be provided to automatically sample, store, and display system data.
- Measured and calculated analog and binary data shall be assignable to user-definable trends for the purpose of collecting operator-specified performance data over extended periods of time. Sample intervals of one minute to 24 hours, in one-minute or one-hour intervals, shall be provided.
- d. Runtime Totalization: Digital Panels shall automatically accumulate and store runtime hours for binary input and output points specified in the "Execution" portion of this Specification.
- (1) The Totalization routine shall have a sampling resolution of one minute.
 - (2) The user shall have the ability to define a warning limit for Runtime Totalization. Unique, user-specified messages shall be generated when the limit is reached.
- e. Pulse Totalization: Digital Panels shall automatically sample, calculate, and store consumption totals on daily, weekly, or monthly basis for user-selected binary pulse input-type points.
- f. Event Totalization: Digital Panels shall have the ability to count events, such as the number of times a pump or fan system is cycled on and off. The user shall have the ability to define a warning limit. Unique, user-specified messages shall be generated when the limit is reached.

18. APPLICATION SPECIFIC CONTROLLERS

- a. Each Network Controller shall be able to extend its monitoring and control through the use of standalone Application Specific Controllers (ASCs/DDC).

- b. ASC's/DDC's shall directly support the temporary use of a portable service terminal that can be connected to the ASC/DDC via zone temperature or directly at the controller. The capabilities of the portable service terminal shall include, but not be limited to, the following:
- (1) Display temperatures
 - (2) Display status
 - (3) Display setpoints
 - (4) Display control parameters
 - (5) Override binary output control
 - (6) Override analog setpoints
 - (7) Modification of gain and offset constants

19. **OPERATOR INTERFACE**

- a. Basic Interface Description:
- (1) Command Entry/Menu Selection Process: Operator interface software shall minimize operator training through the use of English language prompting and English language point identification.
 - (2) Password Protection: Multiple-level password access protection shall be provided to allow the user/manager to limit control, display, and data base manipulation capabilities as deems appropriate for each user, based upon an assigned password.
 - (a) A minimum of four (4) levels of access shall be supported:
 - Level 1 = Data Access and Display
 - Level 2 = Level 1 + Operator Overrides and Commands
 - Level 3 = Level 2 + Operator Management
 - Level 4 = level 3 + Database Generation and Modification
 - (3) Logs and Summaries: Reports shall be generated manually, and directed to the displays. As a minimum, the system shall allow the user to easily obtain the following types of reports:
 - (a) A general listing of all points in the system shall include but not be limited to the following:
 - Points currently in alarm
 - Off-line points
 - Points currently in override status
 - Points in Weekly Schedules
 - Holiday Programming
- b. Personal Computer Operator Interface:

The Personal Computer shall directly connect to the network of DDCs. All of the operator and control functions on the Personal Computer.

- (1) The Personal Computer (Laptop) shall be general purpose and commercially available, with sufficient memory and processor capacity to perform all functions described in this Specification. Minimum computer requirement: 2.0 Ghz Pentium with 2 MB RAM, 160 GB hard drive, CD ROM drive, and a 10100 wireless network card.

20. COLOR-GRAPHICS SOFTWARE

- a. Dynamic Color Graphic Displays: Color graphic floor plan displays (disks will be given to the successful Contractor by the Engineer for his use) and system schematics for each piece of mechanical equipment, including air handling units, relief & exhaust fans, unit heaters, fan coil units, chilled water systems, and hot water systems, shall be provided as specified in the Execution portion of this Specification to optimize system performance analysis and speed alarm recognition.
 - (1) System Selection/Penetration: The operator interface shall allow users to access the various system schematics and floor plans via a graphical penetration scheme, menu selection, or text-based commands.
 - (2) Dynamic Data Displays: Dynamic temperature values, humidity values, flow values, pressures, and status indication shall be shown in their actual respective locations, and shall automatically update to represent current conditions without operator intervention. Areas in a building or equipment within a building shall be capable of being assigned to change color to reflect the condition within the area or status of the equipment.
 - (3) Graphics Definition Package: Graphic generation software shall be provided to allow the user to add, modify, or delete system graphic displays.
 - (a) The FMS Contractor shall provide libraries of pre-engineered screens and symbols depicting standard air handling unit components (e.g. fans, cooling coils, filters, dampers, etc.), complete mechanical systems (e.g. AHU, VAV, etc.) and electrical symbols.
 - (b) The graphic development package shall use a mouse or similar pointing device in conjunction with a drawing program to allow the user to perform the following:
 - Define symbols
 - Position and size symbols
 - Define background screens
 - Define connecting lines and curves
 - Locate, orient, and size descriptive text
 - Define and display colors for all elements
 - Establish correlation between symbols or text and associated system points or other displays
 - Define an area of graphic or a symbol and select colors for each of the point states

- (c) Graphical displays can be created to represent any logical grouping of system points or calculated data based upon building function, mechanical system, building layout, or any other logical grouping of points which aids the operator in the analysis of the facility.

To accomplish this, the user shall be able to build graphic displays that include point data from multiple application specific controllers.

21. EXISTING CONTROLS

- a. It shall be this Control Contractor's responsibility to visit the jobsite and verify all conditions effecting work under this Section. The removal of all existing temperature controls shall be his responsibility whether specifically stated in this Specification or not.
- b. Where existing controls are being removed, all exposed piping shall be removed. It will be this Contractors responsibility to cap all pneumatic piping when items are disconnected as long as that piping system is still in use.

22. SEQUENCE OF OPERATION

- a. VAV box control with reheat coil:

Each VAV box and HW valve shall be controlled by a dedicated DDC controller provided by the Temperature Control Contractor. The DDC controller shall have as an input, the space temperature sensor, the space temperature setpoint, the discharge temperature, and the air velocity (cfm) of the box. On a call for cooling, the DDC control shall modulate the supply air damper open or to its maximum cfm setting. On a call for heat, the VAV box damper shall be modulated to the minimum position first. If heat is still required, the hot water valve will be modulated open.

- b. Air handling unit:

- (1) Air handling unit shall start and stop via the building automation system.
- (2) A signal from building automation system shall be used to determine occupied and unoccupied periods individually for the air handling unit.
- (3) The outside air damper at the inlet of the unit shall be closed, the bypass motorized damper above the preheat face & bypass coil shall be closed, the face & bypass dampers shall be closed (blocking off the heating channels) and relief air dampers shall be in the closed position in the unoccupied periods and shall all be of the normally closed type. When the outside air dampers open and upon sensing an increase in building pressure in relation to the outside the relief air damper shall open fully and be proven open, the relief air fan (RF-1) shall start and shall modulate to maintain building setpoint. During occupied hours, the RF-

1 shall be modulated by the VFD to maintain a slight positive pressure of 0.05" W.C. in the building as compared to outside.

- (4) Relief air fan (RF-1) shall stop when supply fan stops and the outside and relief air dampers shall close.
- (5) Provide return air temperature sensor programmed to prevent outside air dampers from opening until return air rises to its daytime setting.
- (6) A discharge stat shall be provided on all units. This stat shall be used to determine low temperature problems during occupied periods. An alarm shall be sent if the temperature falls below its setpoint (45° adjustable). The fresh air damper shall close.

A return/mixed air plenum sensor shall be provided. During un-occupied periods this sensor shall modulate the heating valve serving the main heating coil to maintain a 60°F (adjustable) plenum temperature. An alarm shall be sent when the temperature drops to 45°F. The heating valve serving the main heating coil shall open full.

In the occupied mode, if the outside air temperature drops below 35°F (adjustable) the district hot water heating circulating pump HWP-3 shall start and the 3-way temperature control valve in the district energy hot water main supply & return piping shall modulate as required to return 85°F water to the district energy corporation.

Return air dampers shall be proven open before the fan starts.

- (7) A current sensor shall be installed around AHU-1 supply blower for status indication.
- (8) A current sensor shall be installed around RF-1 relief air blower for status indication.

c. Air handling units with variable air volume:

- (1) A static pressure sensor located in the duct approximately 3/4 of the way downstream of the supply fan (location shown on the plans) shall vary the fan speed to maintain duct static pressure at its set point (adjustable). Another static pressure sensor shall be located approximately 10' downstream of outlet of blower and inlet of exhaust blower to limit static pressure to 4" (adjustable) and an alarm shall register and blower is stopped if this pressure is exceeded. Variable speed drives shall be furnished under Section 15300. Maintained static pressure indicated in inches shall be displayed at the central operators station. This setpoint shall be made in conjunction with the Balancing Contractor under Section 15400.
- (2) Occupied mode. Fan run continuously:

- (a) When the return air temperature reaches the day setting the bypass motorized damper above the preheat face & bypass coil shall open, the face & bypass dampers shall remain closed (blocking off the heating channels) the outside air damper at the inlet of the unit shall open to the minimum outside air position and the return air damper shall close as required to provide the minimum outside air.
- (b) The air handling unit will maintain a pre-selected discharge temperature by modulating the chilled water valve serving the chilled water coil or modulating the hot water valve serving the main heating coil.

When the outside air temperature drops below 35°F the hot water heating valve serving the preheat coil shall go the fully open position, the district hot water heating circulating pump HWP-3 shall start and the 3-way temperature control valve in the district energy hot water piping shall modulate as required to return 85°F (adjustable) water to the district energy corporation. The face & by-pass shall modulate to provide a mixed air temperature downstream just before the filters in the mixing box of 60°F (adjustable).

An economizer cycle shall be provided. When it is determined that the unit is to go into the economizer mode, the bypass motorized damper above the preheat face & bypass coil shall open, the face & bypass dampers shall be closed (blocking off the heating channels), and the outside air damper at the inlet of the unit shall be modulated along with the return air motorized damper to maintain the discharge temperature and the relief air fan shall modulate to maintain building pressure setpoint. If the humidity sensor located in the discharge air ductwork senses high humidity levels, the fresh air damper shall be limited to minimum position.

- (c) A discharge temperature shall be maintained which normally shall be 55°F and may be re-set from the automation system.
- (3) When a signal is received from the automation system that the air handling unit is to go into the unoccupied period:
- (a) The relief fan shall turn off, outside air damper at the inlet of the unit shall be close, the bypass motorized damper above the preheat face & bypass coil shall close, the face & bypass dampers shall close (blocking off the heating channels), the relief air dampers shall close and the return dampers shall be fully open..
 - (b) The air handling unit blowers will start and cycle to maintain the night setback temperatures.

- (c) When heating is required in the night setback mode the temperature control valves to the heating coil at variable volume boxes shall go to wide open flow and the valve to the main hot water heating coil to the Air Handling Unit shall go wide open.
- (4) Provide a differential pressure reading across the fillers. An alarm shall generate when the pressure exceeds .5^u E.S.P. (adjustable).

d. Electrical Service:

The building control system shall monitor current and voltage for each phase of the incoming power to accumulate electrical demand and usage information for a user-specified interval. The Electrical Contractor under Division 16000 shall provide the demand meter for the building but this Contractor shall connect to as required. The system shall accommodate either static or sliding window and demands to match utility company metering method. The building control system shall produce electrical consumption reports containing demand and usage figures for the building.

e. District Energy Plant Hot & Chilled Water:

The District Energy Plant (DEC) shall provide hot and chilled water to the building. DEC Customers are required to design their building HVAC system to facilitate District Energy heating and cooling services. The building energy management system shall maintain the design parameters of the DEC at all times as follows:

- (1) DEC Service Chilled Water Design Criteria customers are required to follow:
 - (a) Design chilled water supply to the building shall be a minimum of 47°F. The temperature controls contractor shall connect to the supply temperature sensor in the Thermal Meter provided by the DEC as required to monitor the supply water temperature.
 - (b) Design chilled water return shall be 57 °F minimum. The temperature controls contractor shall connect to the supply temperature sensor in the Thermal Meter provided by the DEC as required to monitor the return water temperature.
 - (c) Designed chilled water supply head shall be 60 feet maximum at tie-in point.
 - (d) Upon call for district cooling the 3-way valve shall allow the DEC chilled water supply to flow into the building, the chilled water circulating pump (CWP-1 or CWP-2) shall start, the 3-way temperature control valve shall modulate as required to return 57°F (adjustable) water to the district energy corporation.
- (2) DEC Service Hot Water Design Criteria customers are required to follow:
 - (a) Design hot water supply shall be 110°F maximum. The temperature controls contractor shall connect to the supply

temperature sensor in the Thermal Meter provided by the DEC as required to monitor the supply water temperature.

- (b) Design hot water return shall be 90°F maximum. The temperature controls contractor shall connect to the supply temperature sensor in the Thermal Meter provided by the DEC as required to monitor the return water temperature.
- (c) Designed hot water supply head shall be 30 feet maximum at tie-in point. Upon call for district heating the 3-way valve shall allow the DEC hot water supply to flow into the building, the district hot water heating circulating pump HWP-3 shall start, the 3-way temperature control valve shall modulate as required to return 85°F (adjustable) water to the district energy corporation.

b. Boiler:

- (1) Boiler shall be started and stopped from the building automation system. Low water cut-outs shall be provided to stop the boiler in low water conditions (provided with boiler). Boiler shall be locked out from firing until water flow is established. Boilers shall have aquastat and the burners shall stop and start to maintain HW loop temperature which shall be adjustable according to the outdoor air temperature. Temperature control system shall monitor status alarm for Flame Failure, High Temperature Limit & Low Water.
- (2) The boiler loop circulating pump shall be controlled by boiler control panel. The pump shall be shipped with the boiler, piped and prewired to the boiler control panel.

c. Sump Pump:

Connect sump pump high water alarms to building automation system.

d. Existing Sewage Ejector Pumps:

Connect sewage ejector high water alarms to building automation system.

e. Exhaust Fans:

Building automation system shall turn all exhaust fans off individually during unoccupied periods. During occupied periods fans will be enabled through the automation system (by others under Section 16000).

f. Fan coil units:

- (1) Fan coil units shall start and stop individually via the building automation system.
- (2) A room temperature sensor shall be provided for each unit.
- (3) A differential pressure sensor shall be installed around each supply blower for status indication.

- (4) Provide a humidistat (adjustable) downstream of fan coil unit. The heating coil in the unit shall be placed downstream of the cooling coil in a reheat configuration. When the humidistat downstream of the unit detects high humidity conditions leaving the unit, the cooling coil and heating coil shall be energized to form a reheat cycle to maintain the humidity and temperature.
- (5) The fan coil unit will start and cycle to maintain the space temperature setpoint. The hot and chilled water valves shall open/close upon call for heating/cooling to maintain space temperature setpoint.

g. Cabinet Unit Heaters:

A room temperature sensor shall be provided for each unit. Units shall start and stop individually via the building automation system to maintain space temperature.

h. Exhaust Fans:

Building automation system shall turn all exhaust fans off individually during unoccupied periods. During occupied periods fans will be enabled through the automation system (by others under Section 16000).

i. Horizontal Unit Heaters:

One room temperature sensor shall be provided the horizontal unit heater located in the Mechanical/Electrical 056. Units shall start and stop individually via the building automation system to maintain space temperature.

j. Domestic Hot Water Circulating Pumps (P-1):

The domestic hot water circulating pump shall be started and stopped by the BAS and flow shall be indicated for the pump. The domestic hot water temperature shall be available on the EMS.

k. Hot Water Heating Circulating Pumps (HWP-1, HWP-2):

The two (2) hot water heating circulating pumps are duplicate circulators (one to run and the other one a standby). These circulators are variable speed pumps each with a separate variable speed drive. When a pump is operating the respective speed drive shall be controlled by a pressure sensor in the hot water heating loop piping located approximately 3/4 of the furthest distance from the pumps where shown on the drawings. The pumps shall be set to always maintain a minimum of a 20' head pressure differential at the sensor location. Provide lead/lag controls for the pumps.

l. District Hot Water Heating Circulating Pump (HWP-3)

The district hot water heating circulating pumps is a constant volume pump. That shall start on a call of hot water to the preheat coil when the outside air temperature is 35°F (adjustable) or less and shall turn off when the outside air temperature rises above 35°F.

m. Chilled Water Circulating Pumps (CWP-1, CWP-2)

The two (2) chilled water circulating pumps are duplicate circulators (one to run and the other one a standby). These circulators are constant volume pumps. Provide a lead/lag sequence for the pumps.

n. Chemical Feed System:

The 140 degree hot water heating system make-up tanks shall have a pressure sensor installed in the system and the sensor shall start/stop the feed water pump. The Temperature Control System shall control the make-up tank pump. The pressure shall register on the Temperature Control System. The status of the pump shall also register, "off" or "on".

23. POINTS LIST

- a. The following pages 15900-19 through 15900-22 indicate the points list for the input/output required. All controls shall be provided to perform the indicated functions.
- b. All VAV boxes, unit heaters, etc. points shall be addressed in the computer according to the actual room number used in the field. If the room number differs from that shown on the mechanical plans the actual room number shall be used for the address.

END OF SECTION

Input/Output Summary

	Indication and Control											General			Remarks
	Analog						Digital								
	Temperature	Humidity	Pressure	Air Flow	Kilowatt- hrs	Modulation	Start/Stop	Status/Alarm	Open/Close	Staging		Color	Generate		
VAV BOXES:															
Damper/CFM				I		O			O			X	O		See VAV Schedule for Min. Setpoint
Space Temperature	I											X	O		High & Low Temp Alarms
Hot Water Valve						O									Non-spring return, 2-position or 3-way valve, see detail.
Discharge Air	I											X	O		
AHU-1:															
Fan							O	I				X	O		Variable Frequency Drive
Heating Coil						O						X	O		Spring return valve, 2-way, see detail
Cooling Coil						O						X	O		Spring return valve, 3-way, see detail
Outside Air Damper at inlet of unit						O						X	O		Spring return actuator
Relief Damper						O						X	O		
Face & Bypass Dampers						O						X	O		
Return Air Damper						O						X	O		
Bypass damper above the face & bypass coil									O			X	O		
Discharge Air	I	I										X	O		
Return Air	I	I										X	O		
Mixed Air	I											X	O		
Filter Differential Pressure (dirty)			I					I				X	O		
Duct Pressure Sensor			I				I					X	O		VFD shall control fan to maintain setpoint.
Space Pressure			I									X	O		Located by Engineer.

Input/Output Summary

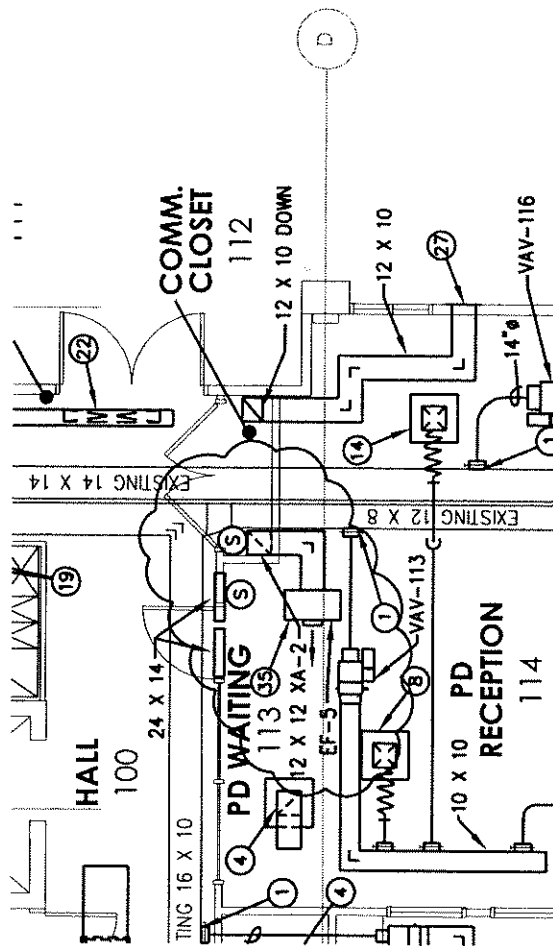
	Indication and Control											General			Remarks	
	Analog							Digital								
	Temperature	Humidity	Pressure	Air Flow	Kilowatt-Hours	Modulation		Start/Stop	Status/Alarm	Open/Close	Staging		Color Graphic	Generate		
ELECTRICAL SERVICE:													X			
Demand									I							Maximum KW.
Usage					I											
DISTRICT ENERGY PLANT:													X			Both hot water and chilled water
Supply Water	I															
Return Water	I								I	O						Upon Alarm 3-way valves #1 & #2 shall close and open.
BOILER:																
Boiler B-1								O	I				X	O		
Loop Supply	I		I										X	O		High & Low Alarms
Loop Return	I												X	O		High & Low Alarms
SUMP PUMP:									I							
SEWAGE EJECTOR PUMPS:									I							Connect to existing alarm for existing pumps.
EXHAUST FANS								O	I				X	X		Typ. All EF's

Input/Output Summary

	Indication and Control											General			Remarks
	Analog						Digital								
	Temperature	Humidity	Pressure	Air Flow	Kilowatt-Hours	Modulation		Start/Stop	Status/Alarm	Open/Close	Staging		Color Graphic	Generate	
FAN COIL UNIT #1:															
Fan								O	I				X	O	
Cooling Coil										O			X	O	2-way valve, see detail.
Heating Coil										O			X	O	2-way valve, see detail.
Space	I												X	O	
Discharge Air	I												X	O	
CABINET UNIT HEATERS:															
Space	I														Remote Sensor
Fan/Heating Coil								O	I						
HORIZONTAL UNIT HEATERS:															
Space	I														Remote Sensor
Fan/Heating Coil								O	I						
HOT WATER HEATING CIRCULATING PUMPS:															
HWP-1						O		O	I				X	O	VFD for each pump
HWP-2						O		O	O				X	O	VFD for each pump

Input/Output Summary

	Indication and Control											General			Remarks
	Analog						Digital								
	Temperature	Humidity	Pressure	Air Flow	Kilowatt-Hours	Modulation		Start/Stop	Status/Alarm	Open/Close	Staging		Color Graphic	Generate	
CHILLED WATER CIRCULATING PUMPS:															
CWP-1								O	I				O	X	
CWP-2								O	I				O	X	
DOMESTIC H.W. CIRCULATOR (P-1)								O	X				O	X	
CHEMICAL FEED SYSTEM:															
Water Makeup Low Level									I						
Water Makeup Pressure			I						I						
Water Makeup Pump								O					O	X	
RELIEF FAN RF-1:						I		O	I				O	X	VFD
DISTRICT HOT WATER HEATING CIRCULATING PUMP :															
HWP-3								O	I				O	X	
OUTDOOR AIR	I	I	I												



ADDITIONAL SHEET NOTES

- 35 EF-5 ABOVE CEILING: INTERLOCK WITH SENSOR IN COMM. CLOSET 112 TO PROVIDE VENTILATION FOR CLOSET. FAN SHALL DISCHARGE TO CEILING PLENUM, ABOVE PD WAITING 113.



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ETI Project No: (0000-0000)

COURTHOUSE PLAZA
EXHAUST FAN SCHEDULE

SCALE: 1/8" = 1'-0"

05/04/07

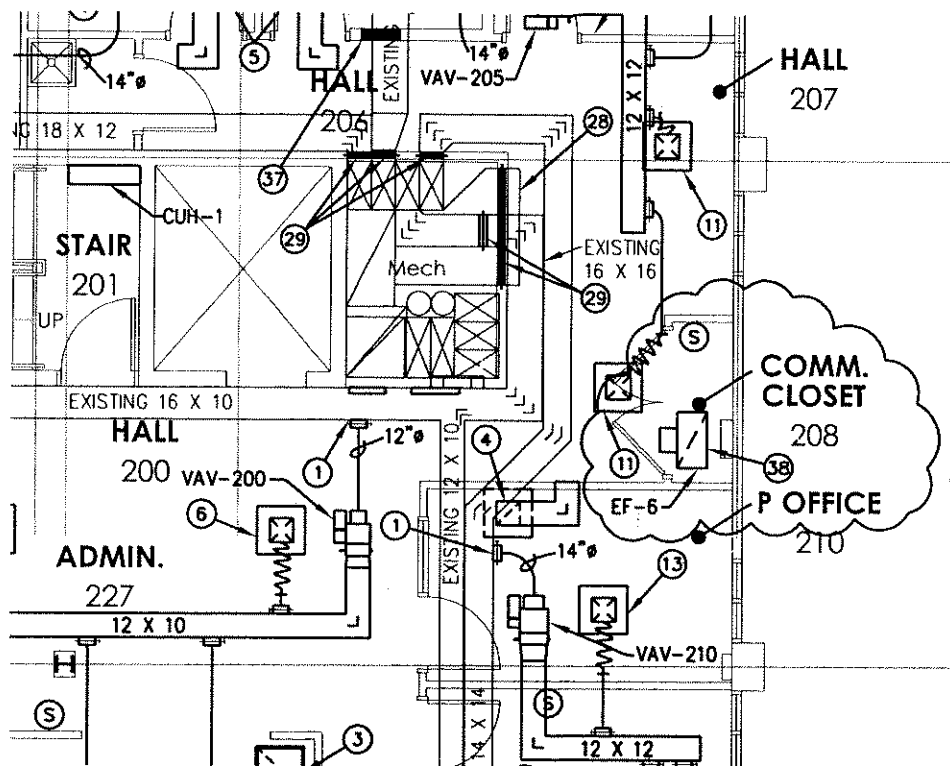
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H200

ATTACHMENT NO.

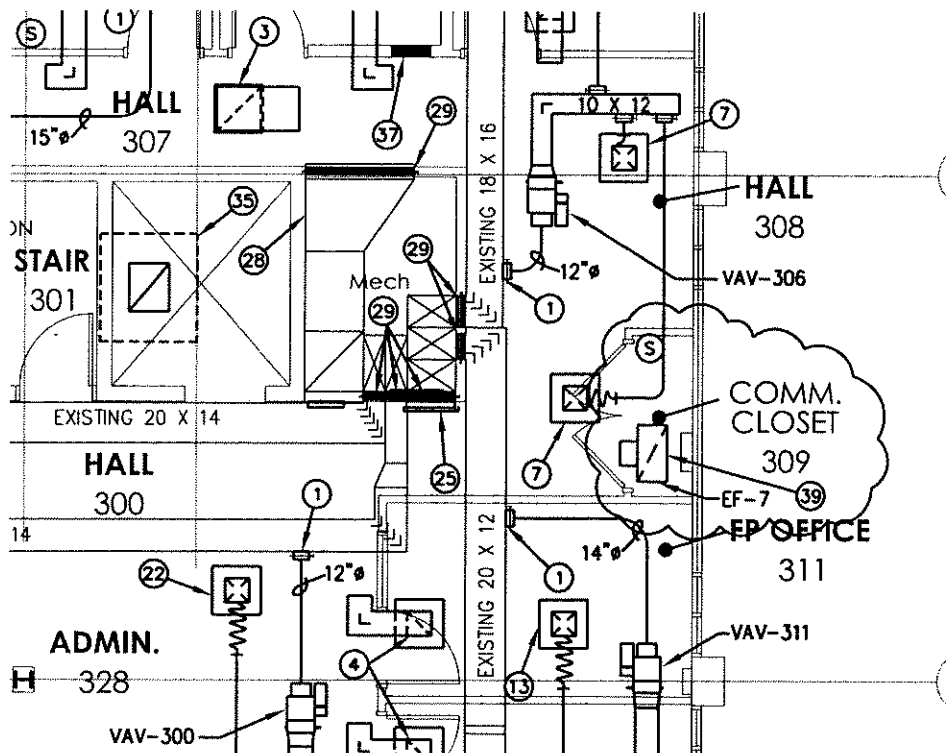
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RPJ



ADDITIONAL SHEET NOTES

- (38) EF-6 ABOVE CEILING; INTERLOCK WITH SENSOR IN COMM. CLOSET 208 TO PROVIDE VENTILATION FOR CLOSET. FAN SHALL DISCHARGE TO CEILING PLENUM, ABOVE HALL 200.
- (39) EF-7 ABOVE CEILING; INTERLOCK WITH SENSOR IN COMM. CLOSET 309 TO PROVIDE VENTILATION FOR CLOSET. FAN SHALL DISCHARGE TO CEILING PLENUM, ABOVE HALL 300.



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H201

ATTACHMENT NO.

2

RPJ

SCALE: 1/8" = 1'-0"

DIFFUSER, GRILLE, AND REGISTER SCHEDULE

MK	MAX N.C.	SUPPLY	RETURN	EXHAUST	FINISH			DAMPER			FRAME TYPE		MANUFACTURER AND MODEL NO.
					WHITE	PRIME	SPECIAL	O.B.D.	NONE	LAY-IN	SURFACE		
CD-1	25	X			X						X		KRUEGER 1400 22 GAUGE STEEL, 24"x24" PANEL
LD-1	25	X					X					X	KRUEGER DESIGNFLO DFL20 WITH VT PATTERN CONTROLLER, 2-INCH SLOTS FRAME FF WITH CONCEALED CEILING MOUNTING WITH DFP 10" PLENUM. VERIFY EXACT COLOR WITH ARCHITECT.
SR-1	25	X			X			X				X	KRUEGER 880H, STEEL CONSTRUCTION, 3/4" BLADE SPACING, DOUBLE DEFLECTION.
RA-1	15		X		X						X		KRUEGER 6490, PERFORATED FACE RETURN, STEEL CONSTRUCTION, 24"x24" PANEL WITH NECK SIZE SHOWN ON PLANS
XA-1	15			X	X			X			X		KRUEGER 6490, PERFORATED FACE RETURN, STEEL CONSTRUCTION, 24"x24" PANEL WITH NECK SIZE SHOWN ON PLANS
XA-2	15			X	X			X				X	KRUEGER S80, STEEL CONSTRUCTION, 3/4" BLADE SPACING, 0" BLADE DEFLECTION.

DIFFUSER, GRILLE, AND REGISTER SCHEDULE NOTES

- CONTRACTOR SHALL COORDINATE WITH GENERAL CONTRACTOR, MOUNTING AND SURFACE CONSTRUCTION PRIOR TO FURNISHING MATERIAL.

COURTHOUSE PLAZA
DIFFUSER, GRILLE, AND
REGISTER SCHEDULE



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SHEET

M302

ATTACHMENT NO.

3

RPI

SCALE: N.T.S.

EXHAUST FAN SCHEDULE

MK	TYPE	CFM	S.P. IN W.G.	MOTOR DATA				IN-LINE, ROOF, WALL OR CLG. MOUNTED	PENN BARRY MODEL # OR EQUAL	AREA SERVED
				HP	VOLT	PH	RPM	SONES		
EF-1	DIRECT DRIVE	590	.25	273 WATTS	115	1	1050	5.6	Z102S (TDA)	WOMEN'S 007, MEN'S 008
EF-2	DIRECT DRIVE	590	.125	273 WATTS	115	1	1050	5.6	Z102S (TDA)	WOMEN'S 107, MEN'S 108
EF-3	DIRECT DRIVE	520	.125	152 WATTS	115	1	1050	3.4	Z101S (TDA)	WOMEN'S 203, MEN'S 204
EF-4	DIRECT DRIVE	520	.125	152 WATTS	115	1	1050	3.4	Z101S (TDA)	WOMEN'S 304, MEN'S 305
EF-5	DIRECT DRIVE	550	.125	152 WATTS	115	1	1050	3.4	Z101S (TDA)	COMM. CLOSET 112
EF-6	DIRECT DRIVE	550	.125	152 WATTS	115	1	1050	3.4	Z101 SCRA	COMM. CLOSET 208
EF-7	DIRECT DRIVE	550	.125	152 WATTS	115	1	1050	3.4	Z101S SCRA	COMM. CLOSET 309

EXHAUST FAN NOTES

1. PROVIDE ALL EXHAUST FANS WITH GRAVITY BACKDRAFT DAMPER, DISCONNECT SWITCH, THERMAL OVERLOAD PROTECTION, VIBRATION ISOLATION HANGING KIT.
2. PROVIDE MOLDED WHITE PLASTIC GRILLE WITH EF-6 AND EF-7.



COURTHOUSE PLAZA
EXHAUST FAN SCHEDULE

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M302

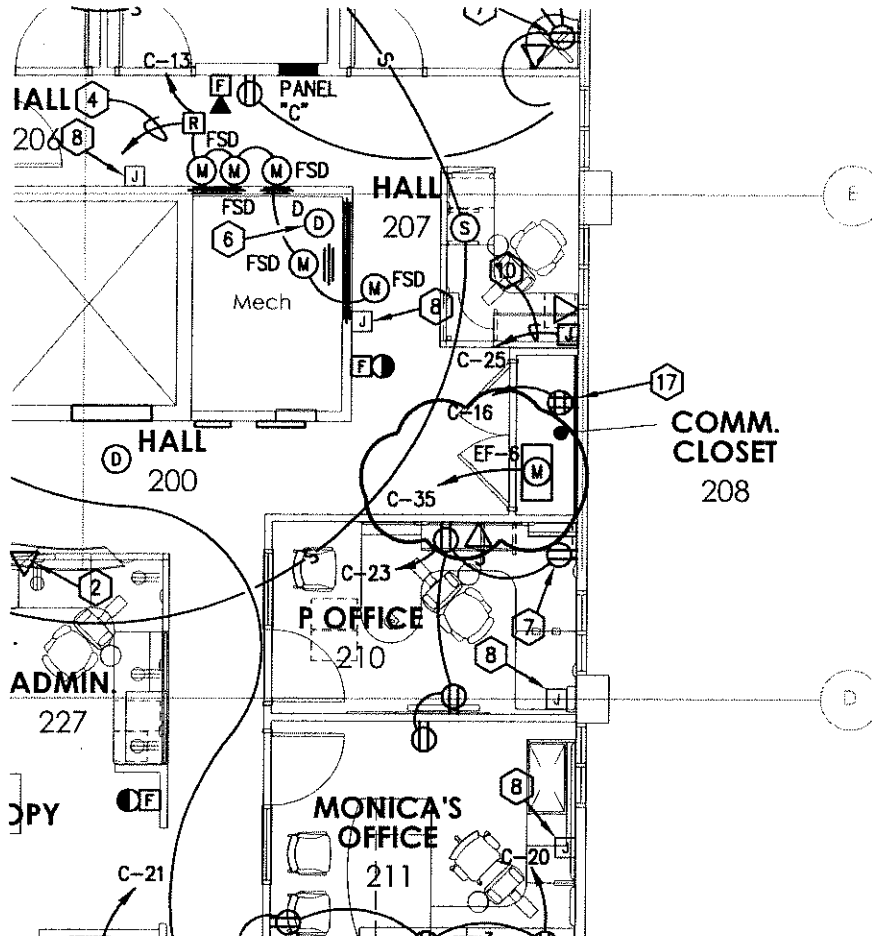
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SCALE: N.T.S.

R.J.F



PBC COURTHOUSE PLAZA SECOND FLOOR PLAN - ELECTRICAL

SCALE: 1/8" = 1'-0"

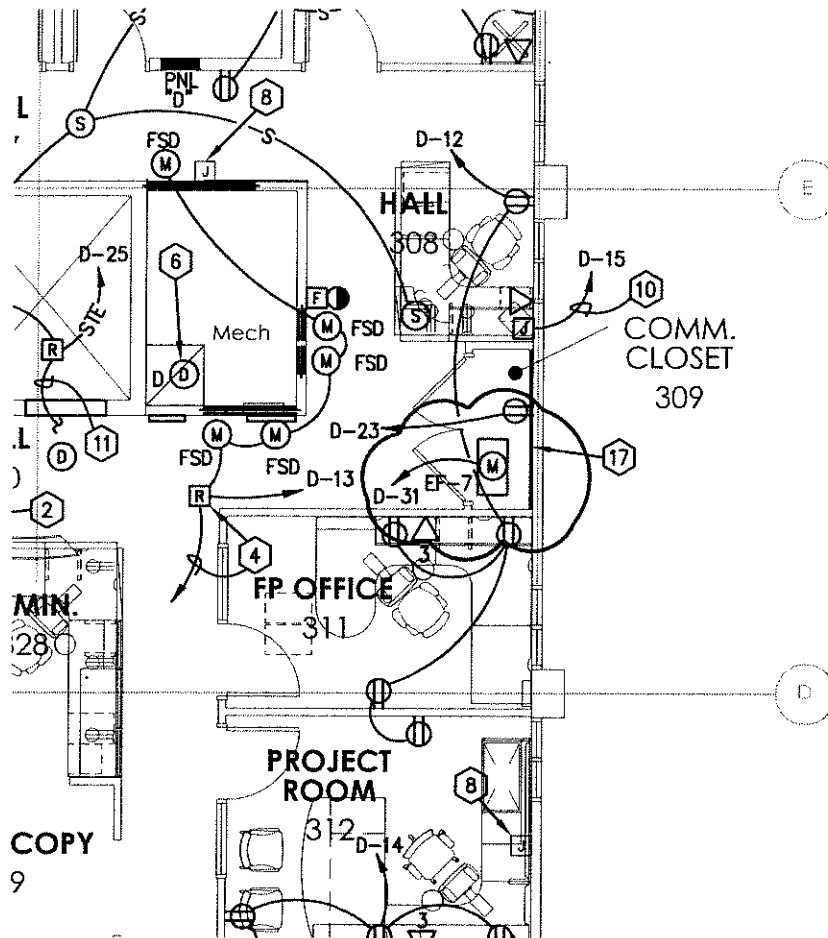


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PBC COURTHOUSE PLAZA THIRD FLOOR PLAN - ELECTRICAL

SCALE: 1/8" = 1'-0"



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